

**1.5**  
**Dividing Polynomials, Synthetic Division & The Remainder Theorem**  
**(A.APR.2)**

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

**Divide  $f(x)$  by  $d(x)$  using long division, and write a summary statement in polynomial form and fraction form.**

**Show all work!**

1.  $f(x) = x^2 - 2x + 3$ ;  $d(x) = x - 1$

2.  $f(x) = x^3 + 4x^2 + 7x - 9$ ;  $d(x) = x + 3$

3.  $f(x) = x^4 - 2x^3 + 3x^2 - 4x + 6$ ;  $d(x) = x^2 + 2x - 1$

**Divide using synthetic division, and write a summary statement in fraction form. Show all work!**

4.  $\frac{x^3 - 5x^2 + 3x - 2}{x + 1}$

5.  $\frac{9x^3 + 7x^2 - 3x}{x - 10}$

6.  $\frac{5x^4 - 3x + 1}{4 - x}$

**Use the Remainder Theorem to find the remainder when  $f(x)$  is divided by  $x - k$ . Show all work!**

7.  $f(x) = 2x^2 - 3x + 1$ ;  $k = 2$

8.  $f(x) = x^3 - x^2 + 2x - 1$ ;  $k = -3$

9.  $f(x) = 2x^3 - 3x^2 + 4x - 7$ ;  $k = 2$

**Use the Factor Theorem to determine whether the first polynomial is a factor of the second polynomial. Show all work!**

10.  $x - 1$ ;  $x^3 - x^2 + x - 1$

11.  $x - 2$ ;  $x^3 + 3x - 4$

12.  $x + 2$ ;  $4x^3 + 9x^2 - 3x - 10$

13.  $x - 3$ ;  $x^3 - x^2 - x - 15$

**Determine whether each binomial is a factor of  $x^3 + x^2 - 16x - 16$ . Show all work!**

14.  $x + 2$

15.  $x - 4$

16.  $x + 1$

17.  $x - 1$

**Divide using any method.**

18.  $(x^5 + 1) \div (x + 1)$